

## TACTILE APPARATUS LINK

### FIELD

[0001] The present invention relates to providing tactile functionality. The invention further relates to, but is not limited to, display apparatus providing tactile and speaker functionality for use in mobile devices.

### BACKGROUND

[0002] Many portable devices, for example mobile telephones, are equipped with a display such as a glass or plastic display window for providing information to the user. Furthermore such display windows are now commonly used as touch sensitive inputs. The use of a touch sensitive input with the display has the advantage over a mechanical keypad in that the display may be configured to show a range of different inputs depending on the operating mode of the device. For example, in a first mode of operation the display may be enabled to enter a phone number by displaying a simple numeric keypad arrangement and in a second mode the display may be enabled for text input by displaying an alphanumeric display configuration such as a simulated Qwerty keyboard display arrangement.

[0003] Furthermore such devices typically also use electro-acoustic transducers to produce audio for earpiece and speaker operations as well as for alert tones. The moving coil dynamic speaker configuration used is typically relatively large in relation to the volume within the device and require specific signal processing considerations in order that the acoustic frequency response is acceptable. Furthermore moving coil transducers can attract contaminants such as small iron particles from within the internal volume of the device and also through ports provided to enable acoustic wave transmission from the speaker to the external environment. These contaminants can cause distortion and faults within the speakers significantly reducing the lifetime of the device.

### STATEMENT

[0004] According to an aspect, there is provided a method for a communications system comprising: determining an input characteristic; generating a signal dependent on the input characteristic; and providing the signal to one or more separate apparatus, wherein the signal is configured to generate a tactile output in a suitable apparatus.

[0005] Determining an input characteristic may comprise: determining a touch input; determining a characteristic of the touch input; and generating a signal dependent on the characteristic, wherein the signal is configured to generate a tactile output.

[0006] Determining a characteristic of the touch input may comprise: determining a force/pressure of the touch input; determining a displacement of the touch input in a first direction relative to an edge of the touch input apparatus; determining a displacement of the touch input in a second direction substantially orthogonal to the first direction; determining a speed of the touch input; determining a co-ordinate of the touch input; determining a number of points of contact of the touch input; and determining a gesture from the touch input.

[0007] Determining a gesture from the touch input may comprise determining at least one of: determining a swipe gesture; determining a pinch zoom gesture; determining a shape gesture; and determining a circular/arc gesture.

[0008] Generating the signal dependent on the input characteristic may comprise at least one of: determining a signal waveform dependent on the input characteristic; determining a signal frequency dependent on the input characteristic; determining a signal amplitude dependent on the input characteristic; determining a modulation of a defined signal dependent on the input characteristic; and determining a signal pulse width dependent on the input characteristic.

[0009] The method may further comprise: determining at least one further input from a separate apparatus; determining a further input characteristic; and generating the signal dependent on the further input characteristic.

[0010] The method may further comprise determining a difference between the input characteristic and the further input characteristic, wherein generating the signal dependent on the further input characteristic may comprise determining the signal dependent on the difference between the input characteristic and the further input characteristic.

[0011] The method may further comprise: generating an audio signal; and mixing the signal and the audio signal to form a combined signal.

[0012] The method may further comprise at least one of: storing the signal; and transmitting the signal.

[0013] Transmitting the signal may comprise at least one of: transmitting the signal as a component of a mixed signal, with at least one audio signal; transmitting the signal as an email; transmitting the signal as a MMS message; transmitting the signal as metadata accompanying an audio signal; and transmitting the signal as a first channel signal accompanying a second channel audio signal.

[0014] Determining an input characteristic may comprise at least one of: determining a status of the vibra component; determining a vibra component parameter; determining a proximity detector parameter; determining an ambient light sensor parameter; determining a magnetometer parameter; determining an accelerometer parameter; determining a GPS parameter; determining a status of the receiver; determining a status of a transmitter; determining a radio frequency receiver parameter; and determining a radio frequency transmitter parameter.

[0015] Generating a signal dependent on the input characteristic may comprise selecting one from a list of defined signals.

[0016] Generating a signal dependent on the input characteristic may further comprise embedding within the signal an indicator that the signal is configured to generate a tactile output in a suitable apparatus.

[0017] The indicator may be an audio watermark.

[0018] Providing the signal to one or more separate apparatus may comprise at least one of: providing the signal via a telephony coupling; providing the signal via a voice over Internet protocol network; providing the signal via a server; providing the signal via a network; providing the signal via a multimedia message service message; and providing the signal via an email.

[0019] According to a second aspect there is provided a method comprising: receiving a signal dependent on an input characteristic from a separate apparatus; and generating a tactile output dependent on the signal.

[0020] Receiving the signal may comprise: receiving the signal from a memory; and receiving the signal from a further apparatus.

[0021] Generating the tactile output dependent on the signal may comprise outputting the combined signal to an audio